Notice of Allowability	Application N .	Applicant(s)	
	09/788,303	SERCEL ET AL.	
	Examiner	Art Unit	
	Michael P. Mooney	2877	

-- The MAILING DATE of this communication appears on the cover sh et with the c rrespondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *5/17/04 Amdt.*.

2. ☒ The allowed claim(s) is/are *3-6,12-17,24,28-32,72,82-85,107,108,152 and 167-252*.

3. ☒ The drawings filed on *16 February 2001* are accepted by the Examiner.

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

REASONS FOR ALLOWANCE

The following is an examiner's statement of reasons for allowance:

The prior art, either alone or in combination, does not disclose or render obvious a method for cylindrical processing of an optical medium, including the steps of:

a. rotating an optical medium about a longitudinal relative rotation axis thereof relative to a processing tool; and

b. spatially selectively applying the processing tool to a portion of a surface of an optical medium, in operative cooperation with relative rotation of the optical medium and the processing tool, thereby producing spatially selective alterations in the optical medium,

wherein the optical medium comprises a silica-based optical fiber including a core and a cladding layer, and the alterations include at least one ring in combination with the rest of claim 3.

It is noted that the claim 3 is allowable because the unique combination of each and every specific element stated in the claim.

The prior art, either alone or in combination, does not disclose or render obvious a method for cylindrical processing of an optical medium, including the steps of:

a. rotating an optical medium about a longitudinal relative rotation axis thereof relative to a processing tool; and

b. spatially selectively applying the processing tool to a portion of a surface of an optical medium, in operative cooperation with relative rotation of the optical medium and

the processing tool, thereby producing spatially selective alterations in the optical medium,

wherein the optical medium comprises a silica-based optical fiber including a core and a cladding layer, and the alterations include a spatially selective surface mask in combination with the rest of claim 4.

It is noted that the claim 4 is allowable because the unique combination of each and every specific element stated in the claim.

The prior art, either alone or in combination, does not disclose or render obvious a method for cylindrical processing of an optical medium, including the steps of:

a. rotating an optical medium about a longitudinal relative rotation axis thereof relative to a processing tool; and

b. spatially selectively applying the processing tool to a portion of a surface of an optical medium, in operative cooperation with relative rotation of the optical medium and the processing tool, thereby producing spatially selective alterations in the optical medium,

wherein the optical medium comprises a silica-based optical fiber including a core and a cladding layer, and the optical medium includes a hermetic carbon outer coating and the alteration includes the step of spatially selectively removing the hermetic carbon coating in combination with the rest of claim 5.

It is noted that the claim 5 is allowable because the unique combination of each and every specific element stated in the claim.

The prior art, either alone or in combination, does not disclose or render obvious a method for fabricating a fiber-ring resonator comprising the steps of:

a. rotating a resonator optical fiber about a longitudinal relative rotation axis thereof relative to a processing tool; b. and spatially selectively applying the processing tool to a portion of the optical resonator fiber, in operative cooperation with the relative rotation of the resonator fiber to the processing tool, thereby producing a resonator segment in the resonator fiber, the resonator segment having a circumferential optical path length differing from the circumferential optical path length of the resonator fiber adjacent to the resonator segment in combination with the rest of claim 12.

It is noted that the claim 12 is allowable because the unique combination of each and every specific element stated in the claim.

The prior art, either alone or in combination, does not disclose or render obvious a method of fabricating an alignment member by cylindrical processing of an optical fiber, comprising the steps of: a. rotating an optical fiber about a longitudinal relative rotation axis thereof relative to a processing tool; and b. spatially selectively applying the processing tool to a portion of the optical fiber and the processing tool, thereby producing alterations of the optical fiber including at least one of a radially-projecting portion and a radially-recessed portion in combination with the rest of claim 17.

It is noted that the claim 17 is allowable because the unique combination of each and every specific element stated in the claim.

The prior art, either alone or in combination, does not disclose or render obvious a method for producing a spatially selective alteration on a substantially cylindrical

optical medium, the method comprising the steps of: rotating the optical medium about a longitudinal relative rotation axis thereof relative to a processing tool; and spatially selectively applying the processing tool to a portion of the surface of the optical medium, in operative cooperation with relative rotation of the optical medium and the processing tool thereby spatially selectively altering the optical medium to produce the spatially selective alteration thereon, wherein the optical medium comprises an optical fiber, and the optical fiber includes a hermetic carbon outer coating layer in combination with the rest of claim 24.

It is noted that the claim 24 is allowable because the unique combination of each and every specific element stated in the claim.

The prior art, either alone or in combination, does not disclose or render obvious a method for producing a spatially selective alteration on a substantially cylindrical optical medium, the method comprising the steps of: rotating the optical medium about a longitudinal relative rotation axis thereof relative to a processing tool; and spatially selectively applying the processing tool to a portion of the surface of the optical medium, in operative cooperation with relative rotation of the optical medium and the processing tool thereby spatially selectively altering the optical medium to produce the spatially selective alteration thereon, wherein the optical medium comprises an optical fiber, and the optical fiber includes a hollow-core optical fiber in combination with the rest of claim 28.

It is noted that the claim 28 is allowable because the unique combination of each and every specific element stated in the claim.

The prior art, either alone or in combination, does not disclose or render obvious a method for producing a spatially selective alteration on a substantially cylindrical optical medium, the method comprising the steps of: rotating the optical medium about a longitudinal relative rotation axis thereof relative to a processing tool; and spatially selectively applying the processing tool to a portion of the surface of the optical medium, in operative cooperation with relative rotation of the optical medium and the processing tool thereby spatially selectively altering the optical medium to produce the spatially selective alteration thereon, wherein the optical medium comprises an optical fiber, and the optical fiber includes a hollow-core optical fiber and the hollow core contains at least one of an optically scattering material and an optically absorbing material in combination with the rest of claim 29.

It is noted that the claim 29 is allowable because the unique combination of each and every specific element stated in the claim.

The prior art, either alone or in combination, does not disclose or render obvious a method for producing a spatially selective alteration on a substantially cylindrical optical medium, the method comprising the steps of: rotating the optical medium about a longitudinal relative rotation axis thereof relative to a processing tool; and spatially selectively applying the processing tool to a portion of the surface of the optical medium,

in operative cooperation with relative rotation of the optical medium and the processing tool thereby spatially selectively altering the optical medium to produce the spatially selective alteration thereon, wherein the optical medium comprises an optical fiber, and wherein the spatially selective alteration includes at least one ring between first and second segments of the optical fiber in combination with the rest of claim 30.

It is noted that the claim 30 is allowable because the unique combination of each and every specific element stated in the claim.

. The prior art, either alone or in combination, does not disclose or render obvious a method for producing a spatially selective alteration on a substantially cylindrical optical medium, the method comprising the steps of: rotating the optical medium about a longitudinal relative rotation axis thereof relative to a processing tool; and spatially selectively applying the processing tool to a portion of the surface of the optical medium, in operative cooperation with relative rotation of the optical medium and the processing tool thereby spatially selectively altering the optical medium to produce the spatially selective alteration thereon, wherein:

the optical medium comprises an optical fiber;

the spatially selective alteration includes spatially selectively removal of optical material from the optical medium;

the processing-tool-applying step includes surface-masked wet etching

the optical medium is a silica-based optical fiber including a hermetic carbon outer fiber coating; a surface mask for the optical fiber includes at least a portion of the

hermetic carbon outer fiber coating; and surface-masked wet etching is performed with an aqueous hydrofluoric-acid-based etchant in combination with the rest of claim 72.

It is noted that the claim 72 is allowable because the unique combination of each and every specific element stated in the claim.

The prior art, either alone or in combination, does not disclose or render obvious a method for producing a spatially selective alteration on a substantially cylindrical optical medium, the method comprising the steps of: rotating the optical medium about a longitudinal relative rotation axis thereof relative to a processing tool; and spatially selectively applying the processing tool to a portion of the surface of the optical medium, in operative cooperation with relative rotation of the optical medium and the processing tool thereby spatially selectively altering the optical medium to produce the spatially selective alteration thereon, wherein:

the optical medium comprises an optical fiber;

the spatially selective alteration includes spatially selective alteration of a refractive index of the optical medium;

the refractive index is increased by spatially selective optical-irradiation-induced densification of the optical medium; and

the optical fiber is a germano-silica optical fiber in combination with the rest of claim 82.

It is noted that the claim 82 is allowable because the unique combination of each and every specific element stated in the claim.

The prior art, either alone or in combination, does not disclose or render obvious a method for producing a spatially selective alteration on a substantially cylindrical optical medium, the method comprising the steps of: rotating the optical medium about a longitudinal relative rotation axis thereof relative to a processing tool; and spatially selectively applying the processing tool to a portion of the surface of the optical medium, in operative cooperation with relative rotation of the optical medium and the processing tool thereby spatially selectively altering the optical medium to produce the spatially selective alteration thereon, wherein:

the optical medium comprises an optical fiber;

the processing-tool-applying step includes the steps of: i) controlling relative longitudinal motion of the optical medium and the processing tool, and ii) controlling relative radial motion of the optical medium and the processing tool; and

application of the processing tool to the optical fiber is synchronous with relative rotation of the optical fiber and the processing tool thereby producing a partial ring in combination with the rest of claim 107.

It is noted that the claim 107 is allowable because the unique combination of each and every specific element stated in the claim.

The prior art, either alone or in combination, does not disclose or render obvious an apparatus for producing a spatially selective alteration on a substantially cylindrical optical medium, the apparatus comprising:

a processing tool; an optical medium rotator, the rotator being adapted for rotating the optical medium about a longitudinal relative rotation axis thereof relative to the processing tool; and a processing tool positioner, the positioner being adapted for spatially selectively applying the processing tool to a portion of the surface of the optical medium in operative cooperation with relative rotation of the optical medium and the processing tool thereby altering the optical medium to produce the spatially selective alteration thereon,

wherein:

the processing tool includes a processing beam source and a processing beam delivery assembly for spatially selectively delivering the processing beam to the optical medium; and

the processing tool positioner includes a shadow-mask adapted for spatially-selectively applying the processing beam to the optical fiber in combination with the rest of claim 152.

It is noted that the claim 152 is allowable because the unique combination of each and every specific element stated in the claim.

The prior art, either alone or in combination, does not disclose or render obvious a method for fabricating at least one fiber-ring resonator on a resonator optical fiber, the

fiber-ring resonator comprising a transverse fiber-ring resonator segment integral with the resonator optical fiber between first and second segments of the resonator optical fiber, the resonator segment having a circumferential optical path length sufficiently different from a circumferential optical path length of an immediately adjacent portion of at least one of the first and second segments of the resonator optical fiber so as to enable the resonator segment to support at least one resonant optical mode near an outer circumferential surface of the resonator segment, the method comprising the steps of: rotating the resonator optical fiber about a longitudinal relative rotation axis thereof relative to a processing tool; and spatially selectively applying the processing tool to at least a portion of a surface of the resonator optical fiber thereby producing a difference between the circumferential optical path length of the resonator segment and the circumferential optical path length of the immediately adjacent portion of at least one of the first and second segments of the resonator optical fiber in combination with the rest of claim 167.

It is noted that the claim 167 is allowable because the unique combination of each and every specific element stated in the claim.

The prior art, either alone or in combination, does not disclose or render obvious a method for fabricating multiple fiber-ring resonators on a resonator optical fiber, the fiber-ring resonators each comprising a transverse fiber-ring resonator segment integral with the resonator optical fiber and separated from each adjacent resonator fiber segment by an intervening fiber segment, the multiple fiber-ring resonators being

positioned between first and second segments of the resonator optical fiber, the resonator segments each having a circumferential optical path length sufficiently different from a circumferential optical path length of at least one adjacent intervening segment of the resonator optical fiber so as to enable the multiple resonator segments to support at least one resonant optical mode of a resulting coupled-optical-resonator system near an outer circumferential surface of the resonator segments, the method comprising the steps of: rotating the resonator optical fiber about a longitudinal relative rotation axis thereof relative to a processing tool; and spatially selectively applying the processing tool to at least a portion of a surface of the resonator optical fiber thereby producing a difference between the circumferential optical path length of the resonator segments and the circumferential optical path length of the intervening segments of the resonator optical fiber in combination with the rest of claim 214.

It is noted that the claim 214 is allowable because the unique combination of each and every specific element stated in the claim.

The prior art, either alone or in combination, does not disclose or render obvious a method for fabricating a fiber-taper alignment-and-support structure on a fiber-taper support fiber, the fiber-taper alignment-and-support structure comprising a taper-support segment integral with the fiber-taper support fiber between first and second segments of the fiber-taper support fiber, the taper-support segment being adapted for substantially reproducibly and substantially stably positioning a fiber-taper engaged therewith, the

method comprising the steps of: rotating the taper-support optical fiber about a longitudinal relative rotation axis thereof relative to a processing tool; and spatially selectively applying the processing tool to at least a portion of a surface of the taper-support optical fiber thereby producing the fiber-taper alignment-and-support structure on the taper-support segment of the taper-support optical fiber in combination with the rest of claim 230.

It is noted that the claim 230 is allowable because the unique combination of each and every specific element stated in the claim.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael P. Mooney whose telephone number is 571-272-2422. The examiner can normally be reached during weekdays, M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on 571-272-2415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 571-272-1562.

Michael P. Mooney
Examiner
Art Unit 2877

Frank G. Font
Supervisory Patent Examiner
Art Unit 2877

FGF/mpm
6/21/04